

ABSTRACT OF THE DISCLOSURE

DHCP (4,5-dihydroxy-2-cyclopenten-1-one) has been previously shown to have antibacterial activity against *Escherichia coli*. Global transcriptional pattern of *E. coli* was analyzed in response to DHCP by DNA microarray. It is now shown that DHCP has widespread effects in *E. coli*, affecting genes encoding proteins involved in general metabolism and cell membrane synthesis and functions. In addition, *rpoS* and *RpoS*-regulated genes responding to various stresses are upregulated. DHCP is also shown to inhibit AI-2, an autoinducer involved in interspecies quorum-sensing, and the genes comprising quorum-regulated processes such as virulence, motility and outer membrane functions are downregulated by DHCP treatment. In addition, *cysK* which is a known quorum-sensing gene working in an alternate pathway(s) in *E. coli* increases considerably in response to DHCP. These results suggest that DHCP regulates the switching on/off of the different quorum-sensing circuits in *E. coli*.